REMARKS

Claims 1, 3, 5, 7-17, 19 and 21-28 are pending.

Claim 1 has been amended to recite the subject matter of claims 2 and 4. Claim 17 has been amended to recite the subject matter of claim 20. Claims 2, 4, 6, 18 and 20 have been canceled. Claims 3, 7, 12-14, 19 and 23-25 have been amended for clarity. New claim 28 finds support at page 15, second full paragraph.

No new matter has been added by way of the above-amendment.

Drawings

The Examiner objects to the drawings for not showing the subject matter of claims 12-14 and 23-25. Specifically, the Examiner objects to the fact that the drawings do not show a ***multiple*** stage column with fraction/solution introduction control. In response, Applicants have amended claims 12-14 and 23-25 to be drawn to a two-stage method which is clearly described in Figure 2-1 and Figure 2-2. As such, withdrawal of objection to the drawings is respectfully requested.

Issues Under 35 U.S.C. 112, Second Paragraph

Claims 1-16, 23 and 25 are rejected under 35 U.S.C. 112, second paragraph for being indefinite. Applicants respectfully traverse the rejection.

With respect to claim 1, the Examiner objects to the fact that claim 1 could be interpreted so that a chromatogram results from the separation channels. In response, Applicants have amended claim 1 to clarify that a chromatogram is ***generated*** from the substances eluted from the separation channel with a mass spectrometry detector.

With respect to claim 3, the Examiner objects to the fact that claim 3 recites that the separation channel may comprise an electrophoresis tube and an electroosmotic flow tube which do not necessarily include a chromatographic separation. In response, Applicants have deleted the phrase "an electrophoresis tube and an electroosmotic flow tube" from claim 3.

With respect to claim 23, the Examiner objects to the fact that at line 2, the term "channels" is recited but at line 5, the phrase "the... channel" is used. In response, Applicants

have amended line 2 of claim 23 by replacing the phrase "a separation channels" with "a separation channel."

With respect to claims 14 and 25, the Examiner objects to the phrase "during the... solution is introduced." In response, Applicants have replaced this phrase with "when the... solution is introduced."

Applicants respectfully submit that the claims, as currently amended, particularly point out and distinctly claim the subject matter which Applicants regard as the invention. As such, withdrawal of the rejection under 35 U.S.C. § 112, second paragraph, is respectfully requested.

Prior Art Based Issues

The following prior art based Rejections (A)-(C) are pending:

(A) Claims 1-5, 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0848251 (hereinafter EP '251);

(B) Claims 6-11, 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP '251; and

(C) Claims 17-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 5,413,686) in view of EP '251.

Applicants respectfully traverse Rejections (A), (B) and (C).

The present invention relates to a method and an apparatus for analyzing interactions which are used for analyzing molecular interactions. Analyzing interactions between molecules such as protein-protein, protein -DNA, or protein-low molecular weight compound is indispensable to find functions of biomolecules and effects of pharmaceutical agents.

Claim 1 is drawn to a method for analyzing interactions, comprising the steps of:

> introducing into a separation channel a first solution comprising a substance to be analyzed that is eluted from the separation channel faster, and a second solution comprising a substance to be analyzed that is eluted from the separation channel more slowly, wherein at least a portion of the first solution is introduced into the separation channel after introducing at least a portion of the second solution thereinto;

> generating a chromatogram of the substances eluted from the separation channel with a mass spectrometry detector, and
>
> comparing the generated chromatogram with a chromatogram of the substance comprised in the first solution and/or the substance comprised in the second solution without any interaction with other substances to be analyzed, wherein a determination that there exists an interaction between the substance comprised in the first solution and the substance comprised in the second solution is made, when there is a difference between the chromatograms.

In this interaction analyzing method, the substance in the first solution which elutes faster passes over the substance in the second solution thereby allowing for the interaction between the two substances (see new claim 28). The difference(s) in the resulting chromatogram is (are) analyzed.

Important to the present invention is the fact that the elution profiles of the substances are detected with a mass spectrometry detector. This provides the advantage that the detection is more sensitive than other techniques and does not require labeling.

Applicants respectfully submit that the cited references fail to teach or fairly suggest such a method defined in claim 1 or the apparatus defined in claim 17 for performing said method.

Applicants now turn to the teachings of the cited references.

EP '251 teaches as follows:

> A method for conducting heterogeneous specific binding assays during capillary electrophoresis with on-line detection is disclosed herein. One version on the on-line assay system introduces the slowest migrating assay reagent into a capillary column first. This first assay reagent can be either an antigen or an antibody. After a brief period of electrophoresis, a second assay reagent, which can form a specific binding complex with the first assay reagent, is introduced into the column. During a subsequent period of electrophoresis detectable specific binding complexes are formed within the capillary indicating that one of the assay reagents contains a desired analyte. In another version of the method, a third assay reagent is introduced to the capillary column. The presence of an analyte in one of the assay reagents can then be determined using a competitive binding assay. The assay is performed within the capillary where the first and second assay reagents compete for binding with a third assay reagent to form detectable complexes. (Emphasis added). (See abstract).

This method of EP '251 is graphically shown in Fig. 1 which is reproduced below for the Examiner's convenience.

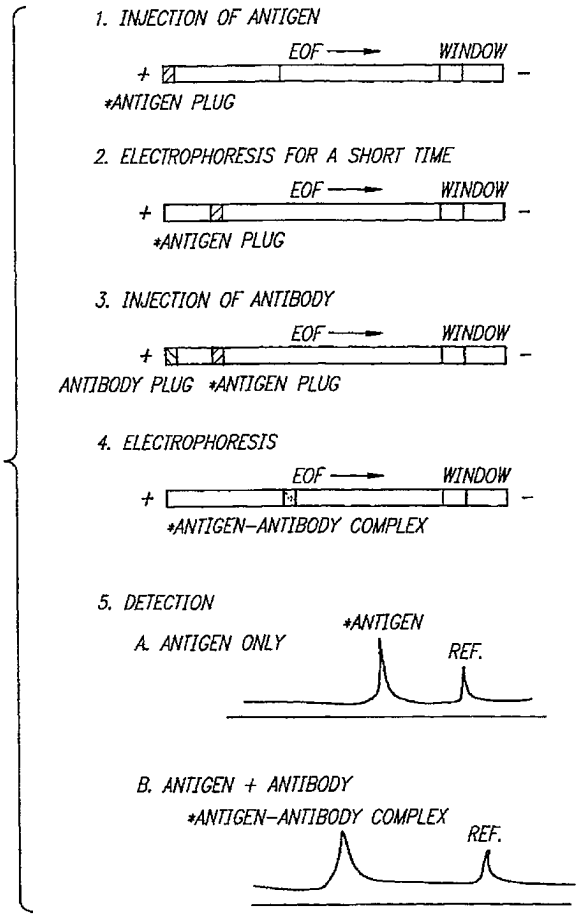

FIG. 1

According to the method of EP '251, the detection of the eluted substances is performed by a "detection means." The detection is performed using "labels" that are light absorbing or radiation emitting, see column 6, lines 7-27, and absorbance detectors are used.

As such, EP '251 fails to teach or fairly suggest the use of a mass spectrometry detector , as presently claimed, which provides the advantage that the detection is more sensitive than other techniques and does not require labeling.

Accordingly, significant patentable distinctions exist between the present invention and

EP '251 and Rejections (A) and (B) are not tenable.

With respect to Rejection (C), the Examiner relies on Klein et al. in combination with EP '251. Similar to the distinction between EP '251 and the present invention, Klein et al. also fails to teach or fairly suggest the use of a mass spectrometry detector.

Accordingly, the combination of Klein et al. and EP '251 does not render claims 17-28 unpatentable.

According to MPEP §2131 and MPEP §2143.03, all claim limitations must be taught or fairly suggested in the cited references for a *prima facie* case of anticipation and obviousness. In view of the fact that neither EP '251 nor Klein et al. teach or fairly suggest the use of a mass spectrometry detector, inventive claims 1, 3, 5, 7-17, 19 and 21-27 are patentable over the cited references. Reconsideration and withdrawal of Rejections (A)-(C) are respectfully requested.

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq., Reg. No. 43,575, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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